LIFE SCIENCES

Policy brief: Economic profitability of the biopharmaceutical industry

BATES WHITE
ECONOMIC CONSULTING

RICHARD MANNING, PHD
SAURAV KARKI, MBA, CFA
Bates White Economic Consulting

SEPTEMBER 2018
INCLUDES NEW 2019 APPENDIX

I. KEY POINTS

- Many traditional industry profitability comparisons fail to appropriately account for the relative financial risks and differing costs of capital across industries.
- A measure that appropriately adjusts for costs of capital to reflect investment risks shows biopharmaceutical industry economic profits to be in the middle of the distribution of all industries.

II. INTRODUCTION

Pricing and profitability issues are never far from the news-cycle for the prescription drug industry. As these issues have recently returned to the headlines, the Twittersphere, blogosphere or whatever sphere one attends for information, it is useful to revisit evidence about the financial performance of this important sector. Typically, thoughts about perceived high prices are followed in near succession by perceptions of high profits. After all, how can profits *not* be high if prices are?

The answer to that question has a great deal to do with a common failure to appropriately adjust for financial risks and costs. By analogy, if one looked at the earnings of someone who just won a large lottery prize, one might be fooled into thinking the lottery is a good investment. It is not. For the vast majority of lottery players, the purchase of a ticket is a losing proposition. To judge the financial soundness of lottery ticket purchases only on the winnings of the lucky few would lead one to a seriously errant conclusion.

In the same way, analyses showing excess profitability among innovative biopharmaceutical companies typically rely on a view of accounting profitability that generally does not address the extraordinary costs and risks faced by the companies in this sector. In order to effectively compete, these companies carry much higher levels of invested capital and have relatively high cost of capital which reflects the return required by investors in a business to compensate for financial risk. Similarly, the accounting treatment of research and development (R&D) expenditures, and the failure to recognize intangible assets also tends to overstate the return on invested capital for innovative biopharmaceutical companies. In order to get a clear picture of the economic performance in this sector, these costs must be factored into the analysis.

Studies that focus on accounting profits in this sector are common. For instance, a recent GAO report indicated that "[a]bout 67 percent of all drug companies saw an increase in their annual average profit margins from 2006 to 2015."[1] The report also noted that the annual average profit margin for the largest 25 drug companies fluctuated between 15 and 20 percent whereas it fluctuated between 4 and 9 percent for companies in other industries. Similarly, research by Sood et al. focused on the common accounting measures of gross and net profit margins in discussing returns in the pharmaceutical industry compared to companies in other sectors, suggesting branded biopharmaceutical sector profits are higher than all other industrial sectors.[2] A more appropriate picture of economic performance considers not only these accounting measures, but also those that reflect differing costs of capital and risks across sectors of the economy.

1 U.S. Government Accountability Office (GAO), "Drug Industry: Profits, Research and Development Spending, and Merger and Acquisition Deals," GAO-18-40: Published: Nov 17, 2017. Publicly Released: Dec 19, 2017.

2 Neeraj Sood, Tiffany Shih, Karen Van Nuys, and Dana Goldman, The Flow of Money through the Pharmaceutical Distribution System (June 2017). USC (University of Southern California), Leonard D. Schaeffer Center for Health Policy and Economics, available at http://healthpolicy.usc.edu/Flow_of_Money_Through_the_Pharmaceutical_Distribution_System.aspx.

This policy brief received financial support from PhRMA. The findings, analysis, and opinions expressed represent those of its authors and do not represent the views or opinions of Bates White LLC or of other Bates White employees or affiliates.

We add to the discussion considering those effects here. The most recently available public data show that economic profitability, which accounts for the cost of capital, for the biopharmaceutical industry is not at the high end of the spectrum of industries in the US economy. Rather, it is in the middle of the pack. Further, the economic profitability of this sector has been declining over time.

A commonly used measure of company performance in finance literature that includes cost of capital is economic profit or economic value added (EVA).[3] This measure is represented by accounting profits less capital expenses. At the micro level, capital expenses are estimated by multiplying a company's invested capital by the firm's cost of capital.[4] This measure is also viewed as the excess returns generated by a firm. Additionally, the EVA spread, expressed as EVA divided by invested capital, can be used to more appropriately compare economic profitability across industries.

Invested capital measures the capital invested in the operating assets of the firm or the existing assets of the firm. The investments made by a firm with the invested capital allows the firm to generate earnings. The pharmaceutical industry's high level of invested capital is a reflection of the need to make substantial investments in R&D and expend other upfront costs. The financial risks involved in drug development also contribute to relatively higher weighted average costs of capital for the innovative biopharmaceutical companies.

Aside from adjustments to the cost of capital, the treatment of research and development expenses (which are not capitalized as a long-term asset but recognized in the same period) and intangible assets that are not recognized on the company's financial statement will both lead to an overestimation of reported return on invested capital. A leading finance textbook summarizes this as follows:

> When a company builds a plant or purchases equipment, the asset is capitalized on the balance sheet and depreciated over time. Conversely, when a company creates an intangible asset, such as a brand name or patent, the entire outlay must be expensed immediately.
>
> For firms with significant intangible assets, such as technology and biopharmaceutical companies, failure to recognize intangible assets can lead to a significant underestimation of a company's invested capital, and, thus, overstate return on invested capital (ROIC).[5]

Adjusting for these effects, it has been reported that "[e]mpiric work has illustrated that estimates of economic-based rates of return range from ~2 to ~11 percentage points below various accounting-based rates of return for drug companies."[6] In other words, accounting-based economic profitability measures are overstated for the innovative biopharmaceutical industry because intangible assets are not properly recognized in a company's accounting statement. Despite this point, the analysis in this brief has not been adjusted for either R&D capitalization or unrecognized intangible assets. If we had the data to undertake such adjustments, the measure of economic returns we show would undoubtedly be lower for the biopharmaceutical and other R&D intensive industries.

3 Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance* (New York: McGraw-Hill, 2006), 311. *See* also Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies* (New Jersey: John Wiley and Sons, Inc.: 2005), 63–64. (Economic profit = NOPLAT – [Capital charge or (Invested Capital x WACC)], where NOPLAT stands for net operating profit less adjusted taxes, and WACC stands for weighted average cost of capital.)

4 Invested capital is the sum of equity and debt for a firm. Cost of capital is the weighted average cost of capital for a firm.

5 Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies* (New Jersey: John Wiley and Sons, Inc.: 2005), 199–200.

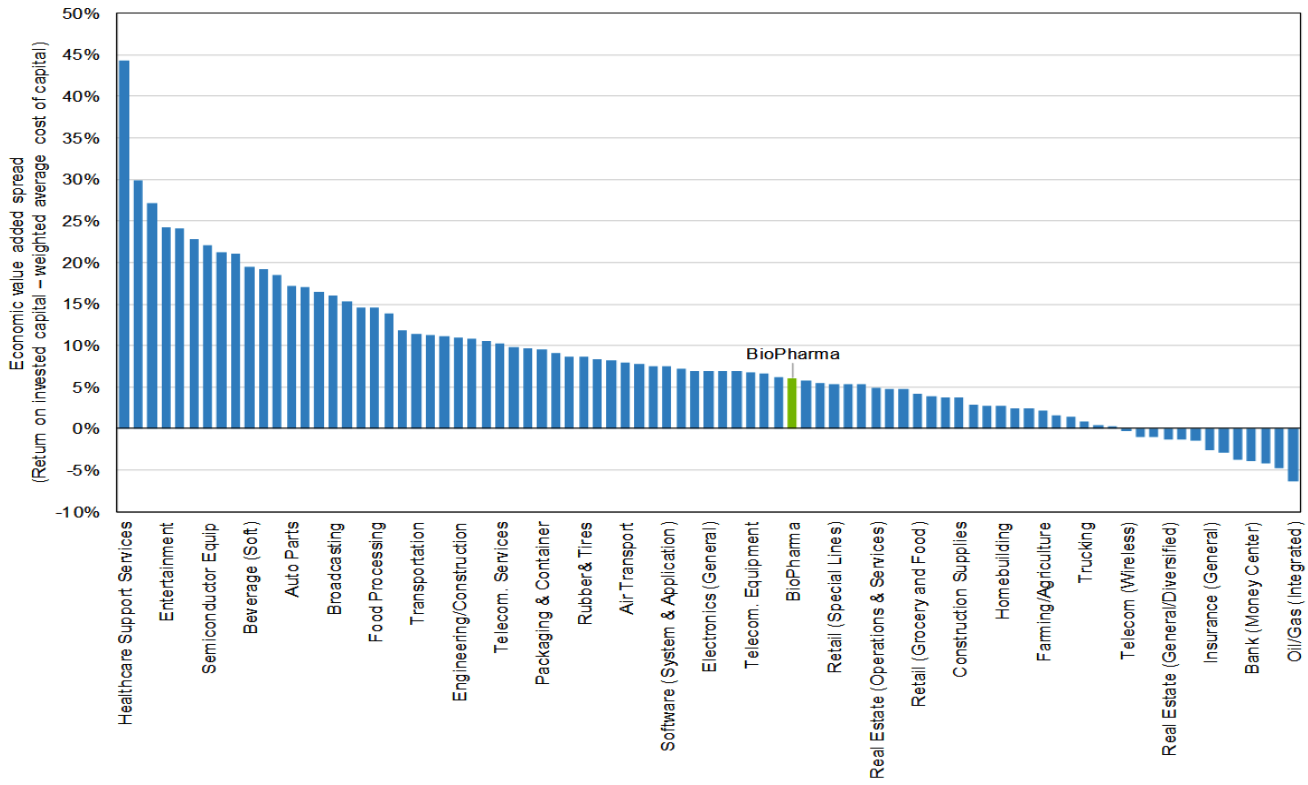
6 Grant H. Skrepnek, "Accounting- versus Economic-Based Rates of Return: Implications for Profitability Measures in the Pharmaceutical Industry," *Clinical Therapeutics* 26, no. 1 (2004): 155–174.

In this brief, we show how the biopharmaceutical industry's EVA spread compares with that of other industries using the most recent publicly available data.[7] We discuss how this industry's EVA spread has changed over time and also include illustrations of trends for EVA spread for other industries for comparison.

III. EVA SPREAD FOR THE BIOPHARMACEUTICAL INDUSTRY IS IN THE MIDDLE OF THE PACK

As illustrated in Figure 1 below, the biopharmaceutical industry's economic profit measure (i.e., EVA spread) places it around the middle of the distribution of all industries in the latest data available. This is not surprising because, although the biotech and pharmaceutical industries have higher levels of accounting profits, they also have substantially higher level of invested capital, and higher cost of capital.

Figure 1 – Economic value added (EVA) spread for 2017[8]



Source: Damodaran Online (data updated January 5, 2018). The chart includes industries with positive return on equity.

7 All of the current and historical data used in this paper are publicly available from Damodaran Online. See http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html

8 Return on capital is EBIT (1-t) / (BV of Debt + BV of Equity-Cash). See Damodaran Online, Financial Ratios and Measures. http://people.stern.nyu.edu/adamodar/New_Home_Page/definitions.html. EBIT stands for earnings before interest and taxes, t stands for taxes, and BV stands for book value.

IV. TRENDS IN ECONOMIC PERFORMANCE OVER TIME

In addition to invested capital requirements and related issues discussed above, company performance depends on economic conditions that evolve over time, including business cycles and changes in overall demand patterns in an economy. To illustrate how performance has changed over time, Figure 2 below presents the EVA spread for a handful of industries from 2001 through 2017. Unsurprisingly, some industries have experienced steady increase in EVA over time, and others have experienced fluctuations.

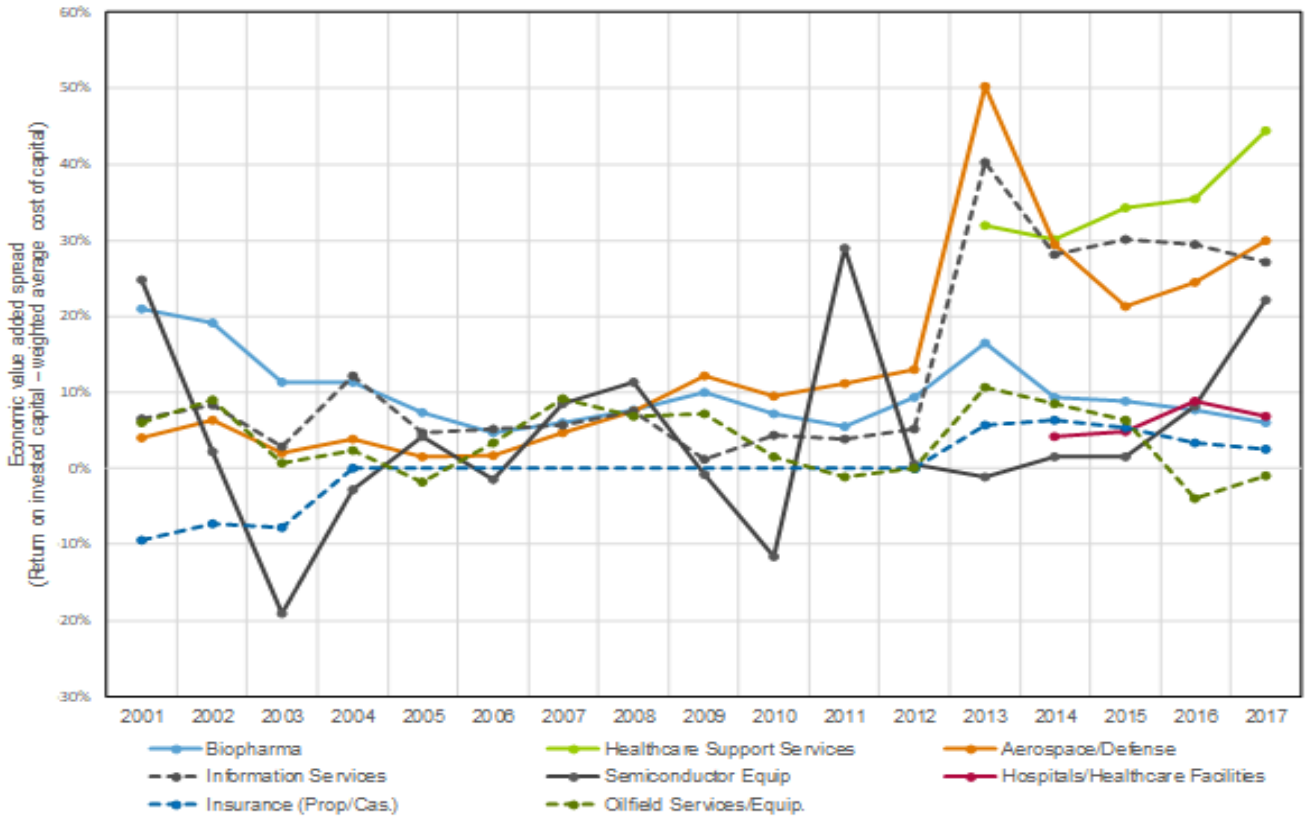
It is interesting that the EVA spread for the healthcare support services industry (which includes pharmacy benefit managers, drug wholesalers, and insurers, among others) has been among the highest since 2013, when the data for that industry begin. The EVA spread for the aerospace and defense industry has shown a steady increases from early 2000s to the present—increasing from 4% in 2001 to 30% in 2017. The semiconductor equipment industry's EVA spread was over 20% in 2017 but has varied substantially since 2001. The economic performance of the biopharmaceutical industry has been within the range of other industries over the time period for which we have data.

Figure 2 also shows that the EVA spread for the oil services and equipment industry was negative in 2011 and has fluctuated between a low of -3.9% in 2016 and a high of 10.6 % in 2013. This relative lower levels of EVA spread is also a reflection of relatively high invested capital requirements. The EVA spread for the property and casualty insurance industry was relatively low at 2.5% in the most recent period. The EVA spread was -9.4% in 2001 and reached a high of 6.3% in 2014 (data were not available between 2004 and 2010). The lower levels of EVA spread for this industry is attributable to a relatively high level of invested capital required to operate the property and casualty insurance business.

As discussed above, while accounting for the cost of capital, EVA spread does not fully account for the treatment of intangible (unmeasured) capital that results from R&D investment. Measuring this intangible capital is difficult at an industry level, but given that the biopharmaceutical industry is one of the most R&D intensive industries, this measure still most likely overstates the financial performance of that, and other R&D intensive sectors. Moreover, the trend for economic profitability in this industry is downward, something that is a concern for an industry that is responsible for bringing to market products that enable progress against important diseases.[9]

9 For a more complete discussion of the potential impact of declining economic returns in drug discovery, see E.R. Berndt, D. Nass, M. Kleinrock and M. Aitken, "Decline in Economic Returns from New Drugs Raises Questions About Sustaining Innovations," *Health Affairs* 34, No. 2 (2015): 245–252.

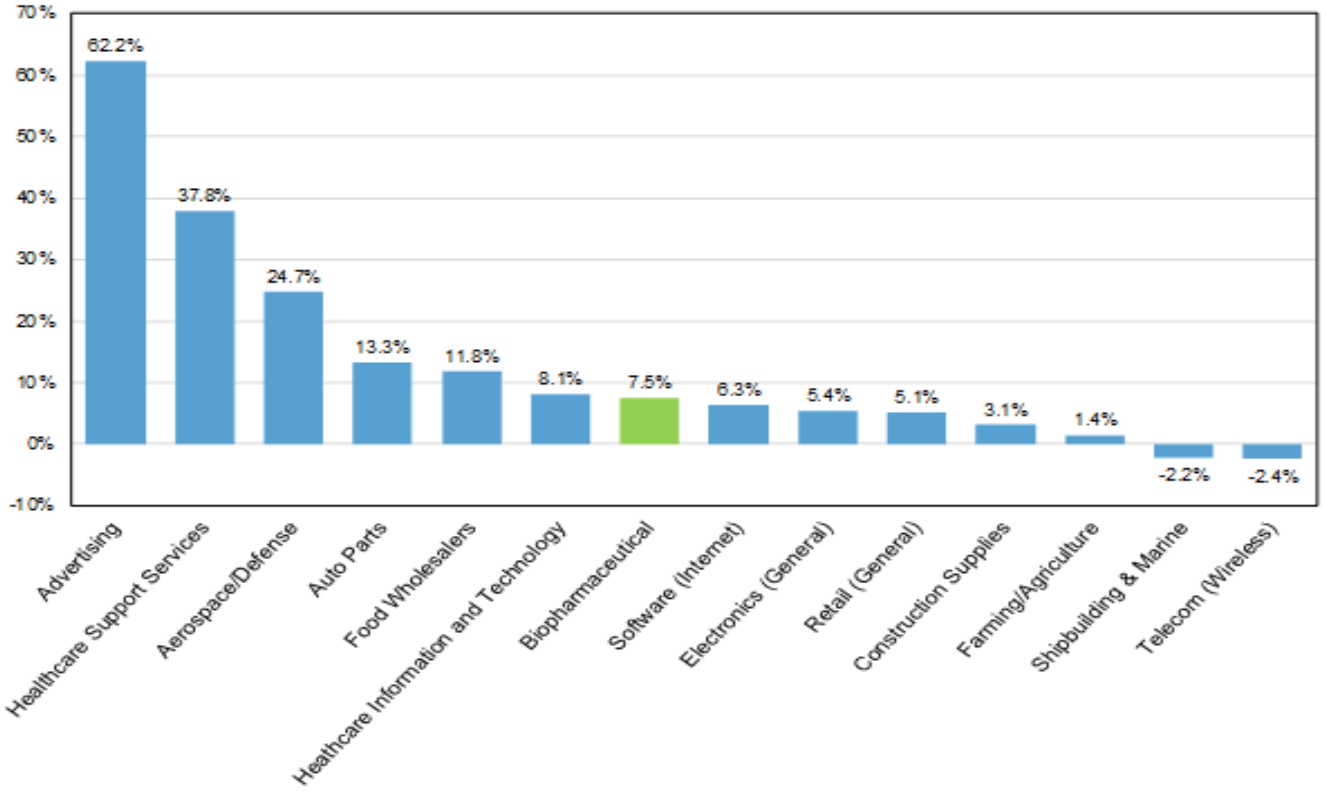
Figure 2 – Economic value added (EVA) spread for various industries



Source: Damodaran Online. Data for each year updated in January of the following year (i.e., 2017 data as of January 2018).

In view of the fluctuations in EVA spread over time, Figure 3 shows the average EVA spread for various industries over the last three years for which data are available. Of primary interest, the biopharmaceutical industry's EVA spread of 7.5% is again in the middle of the pack—higher than the -2.5% for the wireless telecom industry but much lower than the almost 38% for the healthcare support services industry.

Figure 3 – Average economic value added (EVA) spread for various industries, 2015–2017



Source: Damodaran Online. Data are for the three recent years and each year's data updated in January of the following year (i.e., 2017 data as of January 2018). Biopharmaceutical industry is the weighted average of biotechnology (6.0%) and pharmaceuticals (8.7%) industries. The three-year average economic profit spread is weighted by the book value of capital.

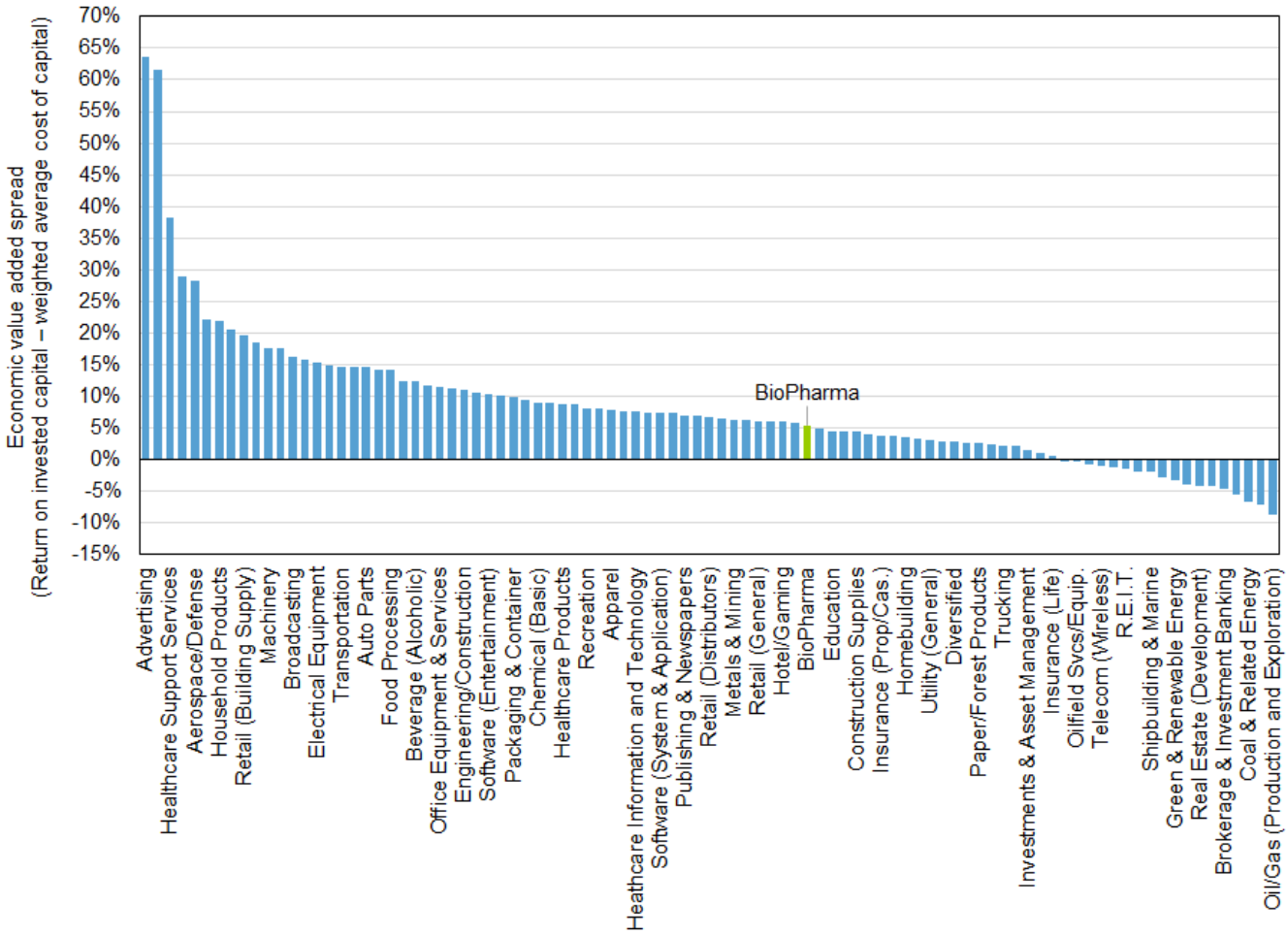
V. CONCLUSION

In this brief, we have reviewed a measure of economic performance that adjusts for the risks born by investors and the varying capital costs associated with differing types of investments across different industries in the US economy. We find that the biopharmaceutical industry is not extraordinarily profitable on this measure, but is in the middle of the pack of US industries. This is a reality that policy makers and other stakeholders ought to bear in mind as policies are considered that will affect the future prospects of this vital industry.

APPENDIX—CONTAINS UPDATED 2018 DATA

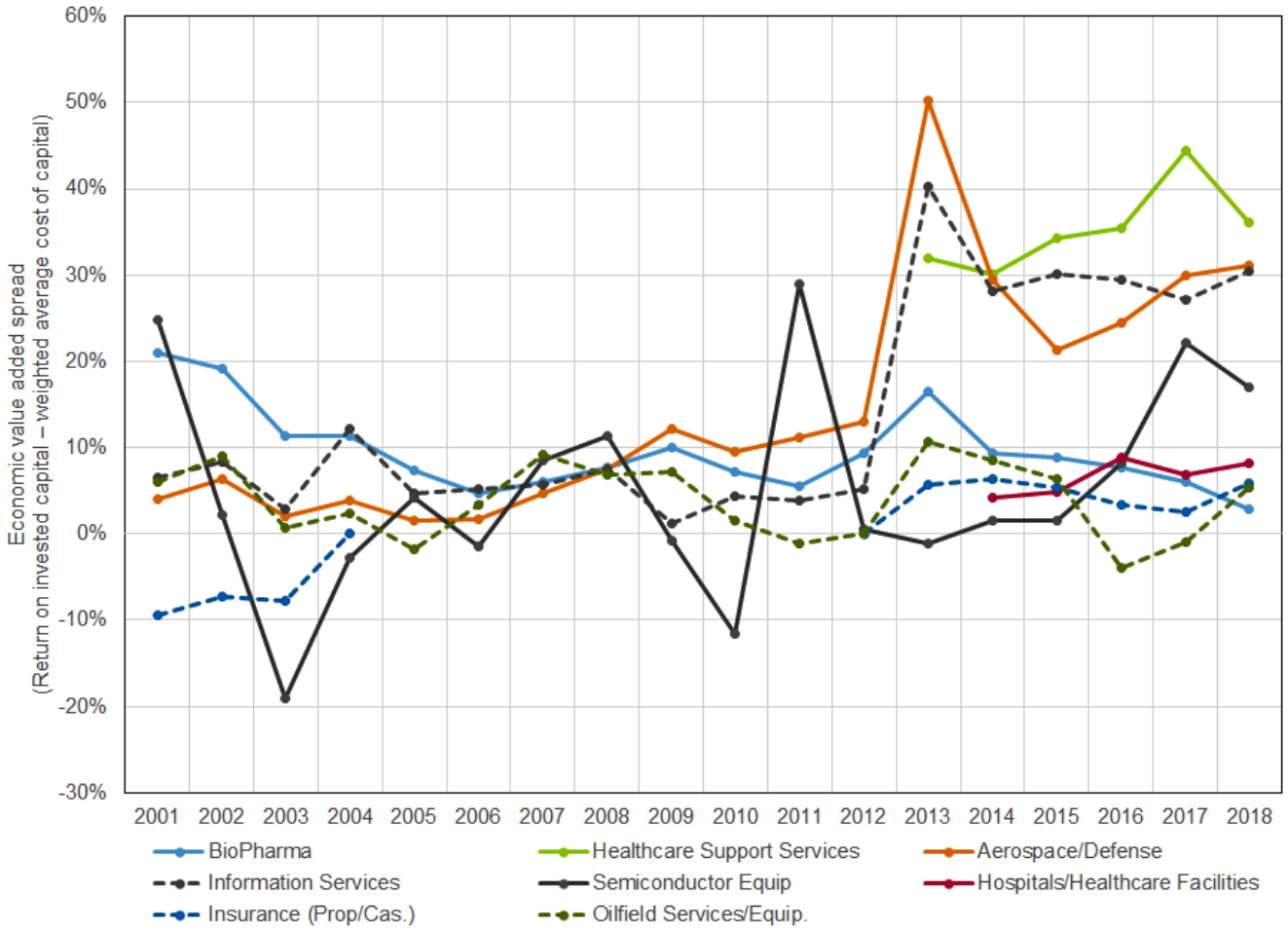
This appendix includes updated figures that contain new data for 2018, updated as of January 5, 2019. Figure A1 is updated to reflect data for 2018, Figure A2 is updated to include additional data for 2018, and Figure A3 is updated to show the three-year average for 2016–2018.

Figure A1 – Economic value added (EVA) spread for 2018



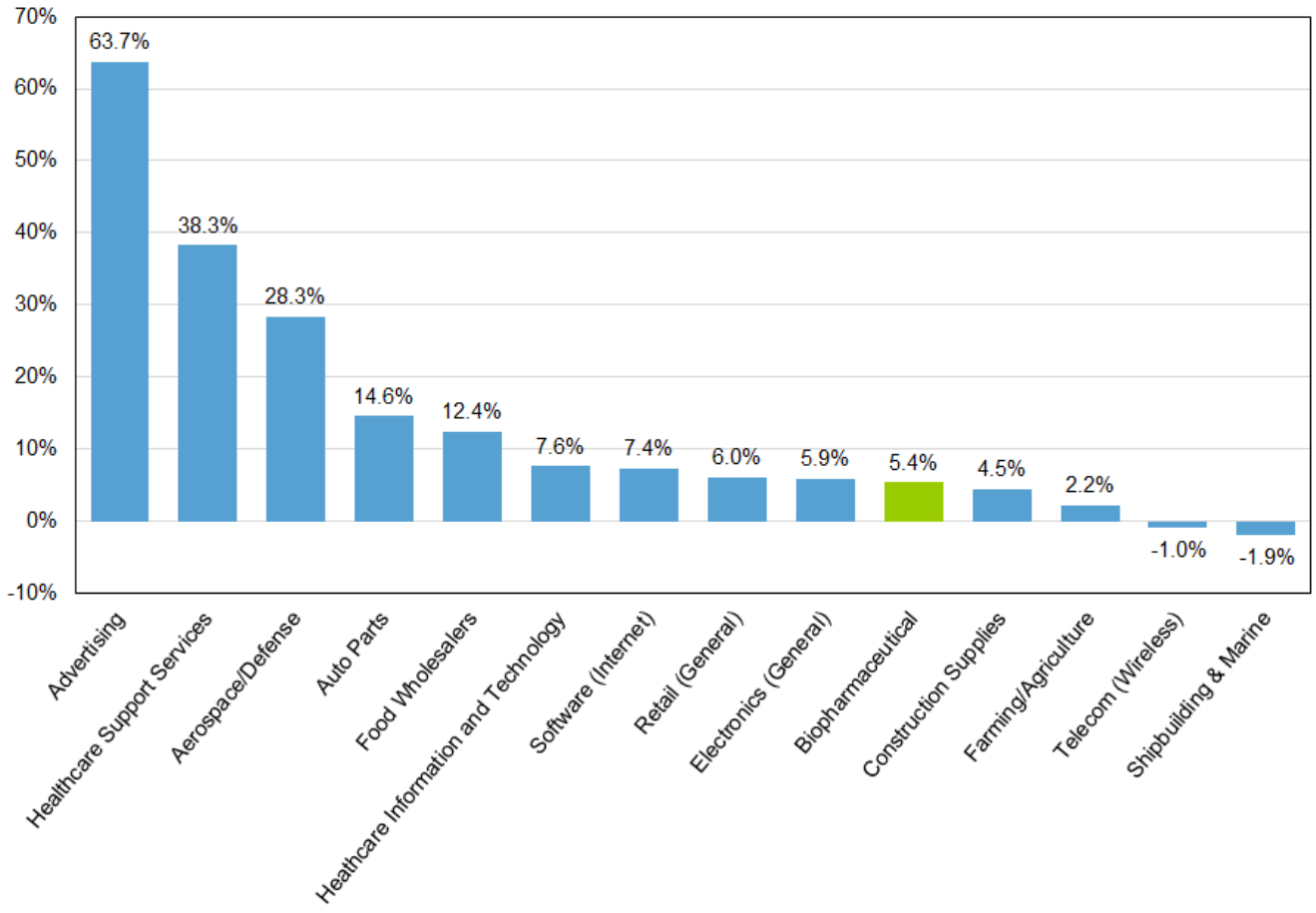
Source: Damodaran Online (data updated January 5, 2019).

Figure A2 – Economic value added (EVA) spread for various industries



Damodaran Online. Data for each year updated in January of the following year (i.e., 2018 data as of January 2019).

Figure A3 – Average economic value added (EVA) spread for various industries, 2016-2018



Source: Damodaran Online. Data are for the three most recent years and each year's data updated in January of the following year (i.e., 2018 data as of January 2019). Biopharmaceutical industry is the weighted average of biotechnology (2.2%) and pharmaceuticals (8.2%) industries. The three-year average economic profit spread is weighted by the book value of capital.

BATES WHITE
ECONOMIC CONSULTING

WASHINGTON, DC

2001 K Street NW
North Building, Suite 500
Washington, DC 20006